degree of IPPA RD was significantly greater than for TI ($p < 0.01$). In addition, IPPA DM significantly improved from 0.62 ± 0.05 initially to 0.71 ± 0.05 after only 20 min of RD ($p < 0.01$) and further improved to 0.85 ± 0.05 after 120 min indicating susbstantial rest RD. Thus, in this canine model of sustained low flow and systolic dysfunction, IPPA RD is superior to TI for the assessment of myocardial viability.

11:00

789-3 Does 99mTc-Sestamibi Gated-SPECT Provide Additional Information Over Ungated-Sestamibi and 201-TI Reinjection Imaging in Viability Assessment?

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Sestamibi imaging is commonly believed to underestimate viability, however its optimal imaging characteristics are not completely explored. Gated-SPECT permits assessment of an original marker of viability, which is the radionuclide myocardial wall thickening (RMWT), defined as increase in count density at end systole. Aims of this study were: 1) to compare 201-TI reinjection and ungated Sestamibi patterns to RMWT in territories with baseline segmental LV dysfunction and 2) to compare the accuracy of these 3 markers to predict functional recovery after successful PTCA. We studied 18 pts with segmental LV asynergies by contrast angiography in myocardial segments supplied by >75% stenotic coronary arteries. All pts were studied by thallium stress-redistribution-reinjection SPECT and by rest Sestamibi gated-SPECT. The assessment of LV performance was based on rest gated radionuclide angiography (RNA) performed before and 2 months after PTCA. The analysis of RMWT was done by visual evaluation in cine mode and by semiquantitative circumferential profile analysis. A 20 segments model was used for SPECT and a 9 segments for RNA. Pre and post PTCA global LV EF increased from $47 \pm 9\%$ to 50 ± 10 ($p < 0.05$). The pts who failed to increase the EF by more than 3% had significantly more asynergic segments that failed to show RMWT compared to pts with EF improvement (3.9 ± 3.8 vs 0.4 ± 1.1, $p < 0.05$). 21/360 segments (6%) showed a severe 201-TI defect (>50% of the maximal uptake) after reinjection and 31 (9%) a severe detect by ungated-Sestamibi. Persistent RMWT was present in 7/21 (33%) and 14/31 (45%) segments respectively. In 61 of 162 segments (38%), there were severe regional wall motion abnormalities. Of these, 28 segments improved after PTCA and 33 did not. The sensitivities for functional improvement after PTCA for gated-SPECT, reinjection 201-TI and ungated-Sestamibi were 93, 86 and 64% respectively (gated vs ungated-Sestamibi, $p < 0.05$). The corresponding specificities were 73, 45 and 61%, respectively (gated-Sestamibi vs 201-TI reinjection, $p < 0.05$). Thus, the persistence of RMWT, as detected by gated-SPECT, in asynergic areas predicts functional improvement after PTCA independent from the presence of severe defects by 201-TI reinjection or ungated-Sestamibi studies.

11:15

789-4 Simultaneous Dual Isotope Imaging with ^{99m}Tc-MIBI and ^{18}FDG-SPECT for Evaluation of Myocardial Ischemia

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An ultra high energy collimator for the Apex Helix (Elscint) was designed and fabricated with acceptable specifications for imaging both ^{99m}Tc and ^{18}F. Five patients (59.4 ± 11.5 years, 4 males/1 female) with a left ventricular ejection fraction of <35% were studied to assess the ability of identifying hibernating myocardium using dual isotope, single acquisition (SDIA) SPECT with ^{99m}Tc-MIBI/^{18}FDG. Patients were loaded with 25–50 grams of oral glucose and after approximately 60 minutes injected with 25 mCi of ^{99m}Tc-MIBI and 10 mCi of ^{18}FDG. After a 35-minute distribution phase, they underwent ^{18}FDG-PET followed immediately by SDIA-SPECT (30 min acquisition). There was excellent correlation between the ^{18}FDG-PET/^{18}FDG-SPECT images. The study identified 2 patients with matched (MA) defects and 2 with mismatched (MM) (hibernating myocardium) defects. One patient had both a MM and a MA defect. Eighteen different patients (56.7 ± 12.2 years, 11 males/7 females) were studied using a rest (10 mCi ^{18}FDG)/stress (25 mCi ^{99m}Tc-MIBI) SDIA-SPECT protocol to identify both acute on chronic and chronic myocardial ischemia. After oral glucose loading and myocardial distribution of ^{18}FDG patients underwent exercise or pharmacological stress followed by administration of ^{99m}Tc-MIBI. Patients were imaged 15–30 minutes later with SDIA-SPECT. In the patients studied there were 16 MA defects, 12 MM defects and 2 normal studies. Eight of the 18 patients studied underwent cardiac catheterization with no false positive results.

Conclusion: Simultaneous dual isotope acquisition-SPECT using ^{18}FDG/^{99m}Tc-MIBI may provide an alternative, accurate, cost-effective method compared to $^{13}NH_3$/^{18}FDG or ^{201}TI reinjection to identify both acute on chronic myocardial ischemia and hibernating myocardium.

11:30

789-5 Use of Rest Tomoscintigraphy with a Methylated Labelled Free Fatty Acid to Detect Myocardial Viability After Myocardial Infarction in Areas with Irreversible Defects on Exercise Single-Photon Emission-Computed Tomography-Tl201 with Rest-Reinjection

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Detection of residual myocardial viability after myocardial infarction (MI) remains a diagnostic challenge. The aim of this study was to determine whether uptake of [123-I]-16-Iodo-3-Methylhexadecanoic acid (MIHA) inside areas with irreversible defects on exercise SPECT-Tl201 with rest-reinjection was related to myocardial viability, as defined by subsequent improvement in perfusion or contractility after percutaneous transluminal coronary angioplasty (PTCA).

In a prospective study, 62 patients (pts) with MI underwent exercise SPECT-Tl201 with rest-reinjection, rest-SPECT with MIHA, and X-ray quantitative left ventricular (LV) angiography, prior to a successful PTCA of the MI-related artery. In pts without restenosis (n = 33), a ≥4 months follow-up evaluation of LV contractility (X-ray LV angiography, n = 33) and exercise perfusion (SPECT-TL201, n = 28) was obtained. For each MI territory, a 2-segment (sgt) division was used for analysis of segmental wall-motion on X-ray angiography, and of perfusion on SPECT-TL201 and for MIHA uptake.

Before PTCA, exercise defects reversibility was observed at Tl201-reinjection in 39/66 sgts, and was related to subsequent improvement in contractility for 29 ($p < 0.01$; sens.: 73%, spec.: 62%). Among 23 sgts with irreversible Tl201-reinjection defects, however an increased uptake was evidenced by MIHA in 11 sgts (48%), of which 9 had subsequent improvement in contractility ($p < 0.01$; sens. 82%, spec.: 83%).

For patients who underwent repeat SPECT-TL201 (n = 28), exercise defect reversibility was observed before PTCA in 32/56 sgts, of which 30 had subsequent improvement in exercise perfusion ($p < 0.001$; sens.: 71%, spec.: 86%). Among 20 sgts with irreversible Tl201-reinjection defects, an increased uptake was evidenced with MIHA in 8 sgts (40%) and all had subsequent improvement in exercise perfusion ($p = 0.01$; sens.: 67%, spec.: 100%).

Thus after MI, residual viability can exist in areas with irreversible defects on exercise SPECT-TL201 with rest reinjection. In these areas, MIHA uptake correlates with residual viability, as evidenced by subsequent improvement in both myocardial perfusion and function after successful PTCA.

11:45

789-6 Scintigraphic Assessment of Myocardial Viability in the Late Phase (>4 weeks) of Myocardial Infarction: Comparison Between Sestamibi and Thallium-201

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This study was part of an open multicenter protocol to evaluate the value of tomographic myocardial perfusion imaging with sestamibi and thallium-201 (Tl-201) in the detection of ischemic but viable myocardium in chronic stable coronary artery disease patients with left ventricular dysfunction. A series of 20 patients (pts) with >75% coronary artery stenosis and wall motion abnormality, who were scheduled for percutaneous transluminal coronary angioplasty (PTCA) and had a >4-week old myocardial infarction were included. All pts underwent (a) within 21 days before PTCA, a separate-day rest and stress sestamibi study, a same-day stress, redistribution and 4-hour reinjection study with Tl-201, and a gated blood pool study, (b) within 4–6 weeks after PTCA, another sestamibi and gated blood pool studies. Perfusion and wall motion abnormalities were graded visually. Among the 15 pts who completed the study, left ventricular ejection fraction showed improvement after PTCA in 12 pts (39.9 ± 10.5 vs 45.3 ± 10.8, $p < 0.001$), while wall motion improved in 18 segments repartited into 7 pts. Among these 18 viable areas, pre-PTCA tracer uptake was normal or near-normal in 28% with sestamibi at rest, and in 56% with Tl-201 at redistribution. After exercise, reversible ischemia was observed in 44% of these segments with sestamibi and in 55% with Tl-201.

In conclusion (a) residual myocardial viability was present in nearly 50% of the pts with a <4-week old myocardial infarct, (b) in the viable areas, at rest, sestamibi uptake was more often abnormal than Tl-201 uptake.